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(54) Title: ARTEMISININ-DERIVED TRIOXANE DIMERS

(57) Abstract: In only two steps and in 65% overall yield, natural trioxane artemisinin (1) was converted on gram scale into C-10-carba trioxane dimer (3). This new, very stable dimer was then transformed easily in one additional step into four different dimers (4-7). Alcohol and diol dimers (4 and 5) and ketone dimer (7) are 10 times more antimalarially potent *in vitro* than artemisinin (1), and alcohol and diol dimers (4 and 5) are strongly inhibitory but not cytotoxic toward several human cancer cell lines. Water-soluble carboxylic acid derivatives (8a-10c and 12) were easily prepared from dimers (4-6); they are thermally stable even at 60°C for 24 hours, are more orally efficacious as antimalarials than either artelinic acid or sodium artesunate, and have potent and selective anticancer activities. Further derivitization of the alcohol dimers (4 and 17), diol dimer (5) and ketone (7) has produced a number of analogs also antimalarially active *in vitro* at sub-nanomolar concentrations (most notably: pyridine N-oxides (13, 15, 18, 23, 24 and 25), phosphoric acid triesters (26 and 27), sulfonamide (40) and cyclic carbonate (41)). In addition, dimers (13 and 19) are more efficacious (when administered both orally and i.v.) and less toxic (when administered intraperitoneally to mice as a single dose) than clinically-used sodium artesunate, thereby giving them a better antimalarial therapeutic index than sodium artesunate.

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**INTERNATIONAL SEARCH REPORT**

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**A. CLASSIFICATION OF SUBJECT MATTER**

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US CL : 514/450, 452; 549/348, 354, 358

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 514/450, 452; 549/348, 354, 358

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
CAS ONLINE

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,726,203 A (LI et al) 10 March 1998 (10.03.1998), see the entire document.	1-86
A	EP 0 974 594 A1 (THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY) 26 January 2000 (26.01.2000), see the entire document.	1-86

Further documents are listed in the continuation of Box C.

See patent family annex.

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"A"	document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	

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